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1140 W. Orange Grove Ave., Arcadia, California, U.S.A.

W. H. EDWARDS' LIFE HISTORIES OF NORTH AMERICAN *COENONYMPHA*[1]

F. MARTIN BROWN
Colorado Springs, Colorado

One of the unfulfilled dreams of William Henry Edwards was to publish a volume devoted to the life histories of all of the North American Satyridae. To this end, he made special efforts to urge his many friends, who supplied him with butterflies and eggs of butterflies, to send him material. He had Mrs. Peart draw many illustrations for the proposed volume. The results of Edwards' studies are found in twenty-four notebooks. Apparently there had been twenty-six in the series. Volumes "L" and "T" are missing. The surviving notebooks are preserved in the archives of the State of West Virginia, Charleston, West Virginia. In the same collection is a portfolio containing Mrs. Peart's unpublished drawings. Through the courtesy of Dr. James L. Hupp, historian and archivist for West Virginia, and the cooperation of the Library of the University of West Virginia in Morgantown, I have had prepared a microfilm of Edwards' journals. From these I have copied and presented below Edwards' accounts.

Edwards published accounts of the life histories of two *Coenonympha*. In the Canadian Entomologist for 1887, (19:41-44), he described the early stages of *insulana* McDunnough as *ampelos*. His several batches of eggs came to him from the vicinity of Victoria, Vancouver Island. In the third volume of the Butterflies of North America, he published his account of the life history of *california* Doubleday based upon eggs from Berkeley, California. In this account he proved that this butterfly was double-brooded and that the names *galactinus* Boisduval and *california* referred to these broods.

In addition to these published accounts, Edwards' Journals contain partial or complete accounts of the early stages of five other *Coenonympha*. In Journals N, P and R, are incomplete accounts of *ochracea*, Edwards raised from Colorado eggs. In

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Journals R and T, (the latter now lost), are accounts of *benjamini* McDunnough (as *inornata*) from eggs laid in Montana. A complete account of the life history of *elko* Edwards from eggs collected on the Weber River in Utah is found in Journals R and S. Also in Journal S is a partial account of the Great Basin strain of *ochracea* or a cryptic species related to *elko* (as *pamphiloides* Reakirt) that is incomplete. And lastly, in Journal W is an incomplete account of *haydenii* Edwards from eggs procured from Yellowstone Park females.

Since these unpublished accounts, complete or incomplete, contain information of considerable importance, I have brought them together. I have changed the accounts from verbatim in only three ways. I have used a uniform system for noting the dates, instead of the several that Edwards used. I have spelled out abbreviated words. I have altered the punctuation from series of statements separated by colons, to the same wording separated by commas, colons and periods for sake of more clarity. Thus the work is that of Edwards. Dr. Hovanitz agrees with me that the authorship must be that of Edwards, I have merely contributed an introduction.

COENONYMPHA OCHRACEA Edwards

Edwards worked with four lots of eggs from the Mountains of Colorado.
1884, Journal "N", pp. 77, 111-117, eggs from Nash at Rosita, Colo.
1886, Journal "P", pp. 53-57, 126-127, 156-161, eggs from Bruce at Denver, Colo.
1888, Journal "R", pp. 38, 160-161, 174, eggs from Foster at Salida, Colo.

The following descriptions of Colorado material are those Edwards selected as best fitting each instar. Bracketted notes by Brown.

June 30, 1886.... Received eggs of Coenonympha ochracea today from Bruce, Denver, laid 23 June. There were 25 eggs and 2 larvae just out of egg. (The eggs began to hatch 2 July, or 9 days. The 2 larvae must have been from eggs laid earlier).

EGG: Conical, the top truncated so as to be broad, flat and covered with a flat net work of irregular meshes, very fine about the micropyle, the sides ribbed with fine ribs from the edge of top 5/8 the way down, there are about 40 of them. Below these to the base covered with fine irregular net work. The base well rounded. Color when laid yellow-green, after becoming brown. [N. B. Mottled with brown. F. M. B.].

[First instar, from 1884 account]... 10 or 12 hours after egg: Length 1/10 inch: same shape as Chionobas, thickest in anterior, slight (very little) tapering from 3 and 4 to end. 13 ends in two conical tails meeting at the base, each of which ends in a white bristle. Color yellow white with longitudinal red lines: one fine one mid-dorsal, one heavier subdorsal, one finer mid-lateral. Under side, feet and legs the same color as the rest of the body. On the dorsum are very short, curved down, clubbed white hairs, one to each segment on each side of mid-sorsum. Head obovoid, truncated, a little depressed at suture, the vertices rounded: 1/2 broader than 2: color dark brown, the space over mandibles and the triangle over mandibles yellow brown: a few bent-down, short, clubbed white hairs. Ocelli are black.

[Duration of first instar: 1884, 11 days; 1886, 9 days, 1888, 10 days].

[Second instar, from 1886 account] Description at 24 hours after 1st moult. Length 17/100 inch. Tapering from anterior segements to end, the tails conical, separated at base, reddish at ends. Color of body yellow green, thickly covered with fine white tuberculations. A mid-dorsal dark line, blackish; another like it on mid-side (too low to be called subdorsal); along base a white stripe; next above this a blackish one of paler color than the side stripe and wider, this is separat-

ed from the side stripe by a space broader than said lower paler stripe and in the middle of such space seems an indistinct dark line, as if a line would come out there as the larva grew. Under side, feet and legs paler yellow green. Head apple green, subglobose, narrower towards top, somewhat flattened frontally; ocelli black.

[Duration of second instar: 1884, 13 days; 1886, 16 days; 1888, 17 days].

[Third instar, from 1884 account] Fifteen hours after second moult: Length 24/100 inch. Color green, the body whitish green with dark green bands and stripes. Under side, feet and legs one shade of light green. A medio-dorsal band of dark green, edged a little by yellowish; high on the side is a green line, under this to the basal ridge the side is occupied by two bands of equal width, the upper one like the dorsum, the narrow [lower ?] one dark green. The basal ridge is yellow. The shape is thick anteriorly and tapered to the end, tails as before. Head emerald green, thickly beset with minute yellow tubercles. The body is much dotted with similar tubercles also. Mrs. Peart notes of the larva after third moult (of which she made drawing) "tubercles white, processes black, all turned back except on 2nd segment. The head covered with white tubercles with white processes". These processes are what I have called hairs.

[Duration of third instar: 1884, 17 days; 1886, 31 days; 1888, 30 days].

[Fourth instar, from 1886 account] Aug. 27. One larva passed third moult last night. Length 12 hours after, 33/100 inch. Shape as before, slender. Tails as before, pink. Color yellow green, dotted all over with white points. Mrs. Peart says of larva after 3rd moult: "This stage is covered with white tubercles with short (stumpy) black hairs: the head rough with white tubercles and white hairs. These little hairs (on body), short as they are, all lay back after 2nd segment". On mid-dorsum a dark green stripe. There are traces of two others to the basal ridge, this last yellow. Under side, feet and legs yellow green. Head subglobose and as before: dotted with white points: deeper green than body.

[The larvae went into hibernation sometime after the third moult, while in the fourth instar. In 1884 Edwards placed the larva in a pillbox inside another box and buried this in a pile of rocks in the woods behind his house on November 5th. He retrieved the larva on February 28, 1885. This larva did not pupate. In 1886 the sole remaining larva hibernated on October 27th and was put out of doors for the winter. It was brought in on February 1st, 1887. It survived to pass a fourth moult which is described below. In 1888 Edwards sent the hibernating larvae to his daughter Edith, Mrs. Theodore Mead, to be placed in an ice-house at Clifton Springs, New York. He received them back, living, on April 16th, 1889. These larvae too passed a fourth moult but did not pupate].

[Fifth instar, 1887 and 1889 accounts] Feb. 14, 1887. Larva passed fourth moult last night. Feb. 15. Larva is considerably smaller than before the moult. Length at 12 M. 4/10 inch. Shape as before. Color yellow green, owing to yellow tubercles - decidedly yellow-green. A dark green mid-dorsal stripe, one like it in all respects on mid-side, an indefinite one a little below this, and then the basal ridge, quite yellow. Feet, legs and under side deep green. Tips of tails red. Head emerald green. (The whole upper surface is one shade of yellow green now, not banded in different shades.) Feb. 22. Measured 62/100. The lower half side more green, less yellow, owing to obliteration of the tubercles, while the whole dorsal area is dark green and the basal ridge is less yellow, more green. Perhaps these changes precede pupation pretty closely. Larva thickest on 7-9, then lessening to ends. Mar. 5. Same size. Seems to rest quietly nearly all the time, but weather at present is not clear or warm. The marks vary a little from my late description and I re-describe them. A dark median band, edged lightly with yellow on either side by reason of condensed yellow tubercles. On the side, equidistant from the mid-band and basal ridge, a narrow stripe, nearly as dark as the mid-band, and edged with yellow in the same way but lower side only. The basal ridge yellow. Apr. 28. This larva died today. In 6 weeks it had remained quiet and of late became smaller day by day and so departed.

May 11, 1889. One larva passed 4th moult last night. Length at 7 A. M. 38/100 inch, contracted. All whitish green, upper and lower sides, feet and legs about the same shade. The surface covered with fine white tubercles, so is the head. A pale yellow basal stripe or line. I had a charon pass 3rd moult at the same time and the two were essentially alike, except that charon has lateral green stripes and the other not. Length at 4 P. M., say at 12 hours from 4th moult, 4/10 inch. As described above but also a darker mid-dorsal narrow stripe and two such laterals separated by their own width of the ground (whitish-green). Under side, feet and legs green. Tails red at ends, separated at base, one standing in line with each side of the body. Head yellow green. May 13. In 2 days I have missed one of these larvae and count it lost... May 20. I sent this larva to Mrs. Peart, being mature. She says "This and charon are much alike, but charon is more yellow, and on ochracea is a dark line of green above the upper light line. On charon the dark line is below the upper light line. The processes on ochracea are black: on charon white, with black at top of tubercle". Letter of 26 May.

COENONYMPHA AMPELOS Edwards

[Edwards published an account of the early stages of "ampelos" in the Canadian Entomologist (l. c.). After this he received several more batches of eggs. Nothing in later notes add to the published information. The journal accounts are found in:

1885, Journal "O", pp. 28-88 intermittantly, 180-193, 196-197, 210, eggs from James Fletcher, Victoria, Vancouver Island, B. C., two batches.

1886, Journal "P", pp. 9-40 intermittantly.
1890, Journal "T", pp. 53-95 intermittantly, 216-217, 224-225, 275, eggs from Danby, Victoria, B. C. This journal has been lost.
1891, Journal "U", pp. 16, 24, 26, 29.
1892, Journal "V", pp. 40, 41, 52, 175, eggs from Danby, Victoria, B. C.
[These accounts apply to insulana McDunnough.]

COENONYMPHA INORNATA Edwards

[Edwards's Journals carry two accounts of the early stages of inornata. One of these, the earliest, applies to inornata inornata, the second to inornata benjamini McDunnough. The account of the latter has been lost. It was in Journal "T". This is unfortunate since Edwards was successful only with benjamini. He lost the larvae of inornata during hibernation. The account, as far as it goes, is in 1888, Journal "R", pp. 180-184.]

[Davenport (1941) was successful rearing inornata inornata. His description is scanty and incomplete. Therefore it is important to publish Edwards's notes.]

Aug. 15, 1888. Received eggs of this, laid at Ottawa, from Fletcher. Eggs shaped and ribbed as in ochracea.
Aug. 18. Three larvae out this morning, one died later. Length at six hours, 1/10 inch. Shape as of the genus, thickest at 2 tapering to end, ending in two blunt tails. Head subglobose, twice as broad as 2, yellow-brown. Body gray white on dorsum and upper sides. A mid-dorsal and subdorsal red-brown line and one below spiracles. Under side, feet and legs yellowish. Later: I see three brown lines, the subdorsal, mid-lateral and a lower lateral marking the three close together.
Aug. 19. Two larvae feeding. Color changed to pale or apple green, upper and under sides. The brown lines distinct, but the middle one of the three faintest.
Aug. 31. Both larvae pass first moult.

[Duration of first instar: 13 days. Davenport's ranged from 11 to 19 days.]

At first moult [second instar]: length at 24 hours, 14/100 inch: shape as of ochracea. Color blue-green, finely tuberculated short hairs from each tubercle. Color of tails red. A dark mid-dorsal line and three such on side, close together. Under side, feet and legs green. Head yellow-green, subglobose, tuberculated and like ochracea. In N 210 ochracea is described as having but one lateral line, in P. 157 another description speaks of three stripes on side, not so definite as in this inornata.
Sept. 12. One larva has passed second moult, 2 P. M.: other swollen for same.
Sept. 14. The second larva passed second moult.

[Duration of second instar: 12-14 days. Davenport's ranged from 14 to 27 days.]

Description 12 hours after second moult [third instar]: Length 2/10 inch. Green, covered with fine yellowish sharp tubercles, each with short fine hair. A dark stripe mid-dorsal, one narrower subdorsal, a line just below it and one as broad as mid-dorsal over the basal ridge, this last pale yellow. The stripes are clear of tubercles or any hair. Under side, feet and legs green. Head subglobose, light green, much covered with small yellowish tubercles.

[A marginal note describes this stage of benjamini, q. v.]

Sept. 21. One larva has disappeared.
Sept. 27. For two or three days the other larva has been lethargic. I sent it today to Clifton Springs. On the 19th the length was 22/100. Came back from Clifton Springs on 16 April, 1889.
May 6, 1889. Passed third moult in the night.

[Description of fourth instar:] At 7 A. M. length 2/10. Color whitish-green, the light color caused by innumerable fine white tubercles over upper surface, tails reddish. A dark green mid-dorsal line or narrow stripe free from the white tubercles, two lines on the side separated by a line of equal width of the ground color (whitish-green), then a band of green, and next the pale yellow basal band. Under side, feet and legs green. Head shaped as before, yellow-green, thickly covered with white tubercles.
May 7., 4P. M., larva 24/100. The above description is good now.
June 5. Only 29/100 in length. Feeds a little and looks healthy. There is a black spot on top of head as if there had been a wound and blood coagulated, but the body is healthy, apparently.
June 8., 1 P. M., passed fourth moult. The black spot is not on the head now and the larva looks healthy.
June 9, Description of larva after fourth moult, fifth instar, one day. Length 26/100. Green, covered with fine white tubercles as before. A darker mid-dorsal line, two such, or narrow stripes, on side as at last previous stage, and a band, same as then also, over the ridge, ridge yellow white. Under side, feet and legs green. Head as before. In fact the larva looks just as at last stage previous.

[Duration of fourth instar: 33 days. Davenport's third instar of 19-26 days preceded hibernation.]

July 8. Length 31/100. In more than a week this larva remained absolutely quiet. I had cut off the leaf of grass (I see it was 23 June) and laid it cross-wise on a fresh plant and there the larva has rested up to this date, evidently asleep.
July 16. I sent this larva to Clifton Springs in a pillbox for hibernation. It was about 26/100 long and had not stirred for almost a month. This larva died during the winter.

COENONYMPHA BENJAMINI McDunnough

[During 1890-1891, Edwards observed the entire series of early stages of inornata benjamini. These he recorded, as inornata, in Journal "T", one of the two lost journals. A summary of the timing is found in Index Volume II on P. 68. The eggs were received from William G. Wright who collected them at Maiden, Montana. I present below Edwards's time-table for benjamini and his description of the third instar which is to be found as a marginal note on P. 182 of Journal "R".]

July 13, 1890. Received six eggs.
July 14. Received more eggs.
July 16. Eggs hatching.
July 23. First moult.
Aug. 1. Second moult.
Aug. 29. One passed third moult.
Sept. 1. Another passed third moult..
Sept. 7 and 23. Larvae hibernating and sent to Clifton Springs.
Feb. 16, 1891. Three larvae survived the winter.
Mar. 3. One larva passed fourth moult.
Apr. 7. One larva suspended and pupated.
Apr. 23. An imago emerged.

[Description of third instar:] Length 24/100. Color green, with whitish effect from the fine whitish-yellow tubercles. A dark mid-dorsal stripe (green) and the whole side below the dorsal area the same dark hue, cut by two lines of light, so as to make two equal green stripes and a green band over the ridge, ridge pale yellow.

COENONYMPHA ELKO Edwards

[During 1889-1890, Edwards successfully reared elko from egg to imago. The descriptions of the various developmental stages differ sufficiently from those of insulana McDunnough, the only other member of the ampelos complex for which they are known, to support taxonomic segregation of elko. There is a distinct possibility that there are two cryptic species involved in what we call elko. One of these is double brooded (elko proper) and the other single brooded and called pamphiloides Reakirt by Edwards. Someone living in Utah or southern Idaho should attempt to unravel this tangle. It will mean raising a good many broods from each seasonal appearance of "elko". Currently pamphiloides Reakirt is considered based upon mislabeled specimens of Eurpoean pamphilus Linnaeus, a double brooded species. Edwards's notes on the partial life history of pamphiloides are else where set forth in this paper.

[Edwards's records for elko are found in Journal"R", 1889-1890, pp. 96-99, 201-213, 226-227 and Journal "S", 1890-1891, pp. 107-108.]

June 14, 1889. Received 18 eggs laid 7 June from W. S. Foster at Weber River Canyon, [Utah.] He says the butterfly is found along the bottoms on Weber River and not in the mountains.

June 16. Received about 30 more eggs, sent on the 10th, laid between 8th and 10th. Mrs. Peart compared egg of elko with ochracea and found it similar to the latter, but the vertical ribs are only 1/3 the length of the egg. - Letter Dec. 10, 1889. -

June 17. The first lot hatched. Description of larva [first instar:] Length 8. 5/100 inch. Tapering gradually from 2, ending in two little tails, like the genus. Color pinkish white, a red-brown mid-dorsal line and three such lines, rather finer, on the sides, equidistant, the upper making the sub-dorsal line. Feet and legs whitish. Head subglobular, yellow-green.

June 18. At 24 hours. Length 11/100. Changed to green: feet and legs whitish: the lines have lost there decided reddish color and are a little darker only than the ground color. The body has filled out so that 2 to 7 are equal, then tapering. Head now pinkish brown. Mrs. Peart says of young larvae: "The stripes are paler than on any other species, and now since eating, the green nearly obliterates the pale brown. Tubercles same as ochracea."

[Duration of first instar: 6 days.]

June 23. Two passed first moult about 10 A. M. [Second instar] at 3 P. M.: Length 17/100. Green, covered so thickly with white tubercles as to appear whitish green. Green mid-dorsal and subdorsal lines, a lateral, same width, a little below the subdorsal (they separating a whitish green line equal in width to one of the green ones), then, at equal distance, a broader (twice as broad) green one, and then the yellowish basal ridge. So there are three green lines or stripes on the side, including the subdorsal. Under side, feet and legs green, pale. Tails pale, a whitish green. Head subglobular, bright green, much covered with white points. Ocelli dark. The points on body give very short and fine hairs, with difficulty seen.

June 24. Length 24/100. Tails now red, otherwise as yesterday.

[Duration of second instar: 6 days.]

June 29. Two larvae passed second moult at 4 P. M. [Third instar.] An hour after, length 3/10, 32/100. Whitish green, from the white tubercles. Head emerald green, broader than 2. From 2 dorsum slopes and increases, narrowing again after 6 and sloping to last.

July 5. Two have passed third moult.

[Duration of third instar: 6 days.]

July 6. 24 hours after third moult. [Fourth instar.] Length 54/100. Shape as before: head a little broader than 2. Color whitish green, the green longitudinal lines faint, basal yellow, tails red. Under side, feet and legs bluish green. Head dull yellow-green, with many white tubercles.
July 10. [Fourth instar.] Length 94/100. Slender, thickest in middle, tapering each way, anterior gently, rapidly to 13. The tails red. Color yellow green, the mid-dorsal stripe dark green, the side stripes nearly passed away, only the subdorsal (or upper lateral) showing faintly, the basal ridge yellow. The surface thickly covered with white points, from each a very short hair, or bristle. Head darker green than body, with white points.
July 12. [Fourth instar.] One larva at third moult comes up red, all the rest being green. Description of red larva: length 64/100 inch (I don't know when it moulted.) Color red from 3 to 13, 2 being green and dorsum of 13 is green, but ends of tails are red. A brown mid-dorsal band edged on either side by faint yellow - a mere touch. The only stripe on the side may be called subdorsal, or upper lateral, brown also, narrow and edged on lower side only with faint yellow. Under side green-brown, feet green, legs shade of brown on green, less decided than the venter. Head dull green.

I sent this to Mrs. Peart. Later in the day I got a card from her saying that the single larva she had turned up red after third moult, "green and brown with a pretty pink tint on the surface." This was on second day. It was then green just after the moult.
July 14. Length 94/100. At 3 P. M. one larva has suspended in form of figure 6 and another is about to do the same.
July 15. One pupated at 11 A. M. Two others are suspended.

[Duration of fourth instar: 9 days.]
July 16. Descriptions of chrysalis.
No. 1 Length 42/100. Shape of ampelos. The mesonotum rises to an angle. Color yellow green, four black longitudinal stripes: one curved on the middle of the wing case, one at dorsal edge of wing case from the shoulder and this has the color next to it on the wing whitish in a narrow space.
No. 2 Length 42/100. Color whitey-brown, lightest anteriorly, with a greenish tint, the abdomen quite brown. The four stripes are merely darker than the ground color, no decided color. This came from a green larva.
No. 3 Length 44/100, breadth of abdomen 16/100, of mesonotum 16/100. Color green, the black stripes as in No. 1, but in addition one on the ventral side between the tongue cases to the end of same, as long as the stripe on the middle of said cases, between this and the middle stripe a very short one, or a streak, just within the margin; two short stripes on the antennae cases; so there are in all 9 as in ampelos. The description of ampelos answers for this, except that the mesonotum seems more angular and there are no black marks on 13.
No. 4 Pupated 17th July in P. M.: Green, four black stripes very narrow, mere lines. Length 4/10, breadth of abdomen 18/100 inch.
No. 5 Pupated 20 July. Length 4/10, breadth of abdomen 16/100 inch. Green, four marks only, very slight and pale, just like No. 4.

Mrs. Peart wrote on 29th: "The elko chrysalids are exactly like ampelos in outline, I think. Two of mine have the stripes so pale as scarcely to show. The color of all differ. The one (green) you sent me pupated 15th, gave imago 24th July." Mrs. Peart says a green larva pupated 10th [August.] This pupa is large, striped and mottled gray, quite different from any other I had.

[Duration of pupal period: 8 to 9 days.]

COENONYMPHA "PAMPHILOIDES Reakirt"

[In 1889-1890 Edwards raised into the third instar a Coenonympha that he called pamphiloides Reakirt. His experience with this butterfly is recorded in Journal "S", pp. 104-108, 232. There is some confusion about whether or not he was successful in bringing this species to the imago. What emerged from the pupa of unknown sources was a specimen that Edwards considered elko. I suspect that it was his "pamphiloides." As I suggested under elko there is a riddle to be solved.]
June 28, 1889. Eggs received from Foster, Ogden, Utah.
June 30. Larvae hatching. Three hours after eggs: length 12/100. Shape of the genus, color pinkish white, a red-brown mid-dorsal line, a subdorsal line and two below, equidistant as usual. Head twice as broad as 2, yellow-brown, with scattered white tubercles, shape of the genus. Mrs. Peart says of young larvae: "Just like ochracea, shape of head, tubercles, etc.: color not so yellow, the stripes very pale, and with the first eating took on a green tint. They are now quite green, the brown lines scarcely showing."
July 8. Three larvae passed first moult in the night. Length at 7 A. M. 18/100. Shape of the genus, tails red, color green thickly covered with yellow points, basal ridge yellow. A broad line, mid-dorsal, of dark green, three on the side as on ochracea, elko and the rest. Head subglobose, emerald green, with yellow points (as on the other species). Under side, feet and legs green. 3 P. M. Two more larvae have passed 1st moult, in all 5 today.

[Duration of first instar: 10 days.]
July 9. 7 A. M. at 24 to 30 hours from moult: length 2/10 inch. The green lines dark and distinct. On the side three lines, the lower one indistinct and lying next over basal ridge.

[Duration of second instar: 8 to 18 days.]

July 18. Larvae passing second moult. One passed same on 17th. This A. M.: length 3/10 inch; green; tapering from 2, tails reddish; the stripes, mid-dorsal and lateral, faint, a little darker than the ground; basal ridge yellow.
Aug. 7. Length 4/10 inch. Mrs. Peart had two pamphiloides pass second moult 23 July and 26 July.
Aug. 3. One pamphiloides passed third moult.
Aug. 13. Another passed third moult.
[Duration of third instar: 16 to 26 days, or into hibernation before third moult.]
Aug. 23. There are five larvae. Two of them 44/100 and 5/10 inch. These may still be active, but the other three, not yet at third moult, seem quiet and I have today moved them to pillboxes to test that.
Sept. 1. One larva passed third moult and later died. I have two larvae in hibernation.
Sept. 19. Sent larvae to Clifton Springs.

1890

I sent to Clifton some larvae of this species ["pamphiloides"] and also elko. These came back, one larva only alive, and I got the labels mixed and so do not know which species it is, but it has passed the first moult since hibernation this day, 24 April, 9 A. M. [An added note reads "Elko and The larva was elko "]
Apr. 26. At noon 6/10 inch: thick anteriorly, tapering to end: the two tails red-tipped. Coloring yellow green, the dorsal stripe darker and the side stripes all faint, basal ridge yellow. Feet and legs and under side are darker green than upper side. Head emerald with many yellow points. The body is covered with fine yellow points, from which very short, light and fine hairs. I sent this larva to Mrs. Peart this day.
May 23. Mrs. Peart writes that this larva pupated 14th. Pupa green - an emeral green near head case - and is nearly like ampelos. It is a little larger. There is no dash of black on either side of the cremaster, which shows in all ampelos. Ampelos is not so bright, but of three ampelos no two are alike.
May 30. Received the imago of this larva and it is elko. Pupated 14th and out 26th.
[It is to be noted that the eggs that Edwards thought from "pamphiloides" were laid in late June, about two weeks later than were the eggs of elko. The June eggs of elko produced a late summer brood. The eggs of "pamphiloides" produced larvae that hibernated in the third instar. Several larvae of elko transformed slowly and, except for one, died in August. The exception was sent to hibernation. In the light of my own experience with larvae of Coenonympha I suspect that the larva that died during hibernation was this laggardly elko and that the survivor that went to imago was a "pamphiloides". The general appearances of the imagoes of European pamphiloides and the ampelos-elko complex are such that they are more easily confused than are ochracea imagoes with either of them. As I suggested above, patient life history work with what we now consider elko may well prove that there are two species involved, one single brooded ("pamphiloides") and the other double-brooded (elko). The single brooded species may be a southern relative of columbiana McDunnough, now considered to be a northern single-brooded subspecies of ampelos.]

COENONYMPHA HAYDENII Edwards

[In 1896 Edwards had partial success rearing Coenonympha haydenii. It was this experience that confirmed placement of this odd species in the genus Coenonympha rather than in Erebia where Edwards placed it in his original description and in the third volume of the Butterflies of North America. In the index to that volume he altered the generic placement to Coenonympha. The plate figuring haydenii was released May 28, 1888, and the index March 1, 1897, or later. Edwards's notes are found in Journal "W", pp. 168, 220-222, 224.]
July 28... Received 5 eggs of Coenonympha haydenii. Dr. William Barnes took several females in Yellowstone Park and brought them to Denver, and gave them in charge to Ernest J. Oslar to get eggs and send to me. He says he got and sent 6. The first was laid 20th, sent 24th. I have sent two to Mrs. Peart.
Egg: Conical, rounded at bottom, largely truncated at top and flattened. The upper part of the sides marked by many fine ribs, vertical. The basal part, below ribs, marked with shallow cells.
Mrs. Peart says, 31 July, the egg of haydenii is that of a Coenonympha and not of an Erebia. The top is somewhat flattened, covered all over with a fine net work. The ribs of the side are separated by flat spaces crossed by light ridges rather irregularly. I think scarcely distinct enough or regular enough to be called striae. The ribs are very numerous and fine. I make out 68 or 70. These ribs do not continue to the base, but end about 1/4 of the height from the base in a surface of indentations not very sharply defined as to shape. It is very much like ochracea but the ribs are more numerous and the net work of the top finer.
July 30. Three larvae out about 9 this A. M. One egg collapsed. Length 12/100 inch an hour after. Color white with faint tint of green, the lines pale brown, a dorsal broadest, and two lateral. The dorsal is nearly twice as broad as the lateral. The under side, feet and legs greenish white. Head the color of the body.

July 31. Description of larva one day old. Length 14/100. The shape of galactinus, head considerably broader than 2. Color green-yellow, body now becoming green, a greenish-white. The dorsal and two lateral brown lines. Segment 13 ends in two conical tails.
Aug. 1. At two days, length 16/100, more green, a delicate, pale green. There are but two larvae and they are alike. Mrs. Peart says the young larva is like Coenonympha, also the form segment 13, with its two prongs is the same as on ochracea and pamphiloides. The Erebias terminate bluntly.
Aug. 7. The one larva passed its first moult at 4 P. M. It looks like the genus Coenonympha. There was a second larva, but a few days ago I missed it and on searching through the sod, I found a very active whitish larva, with black head, running up and down the grass leaves as if searching for something. No doubt this fellow has eaten the haydenii. Of course I killed him then and there.
Aug. 8. Description of larva one day after first moult [Second instar] Length 21/100. Thickest anteriorly, tapering to 13, which ends in two conical tails. Color green, surface of the upper side wholly covered with fine whitish tuberculations, each with a white downy short hair. The mid-dorsal stripe missing these [tubercles] and is green, dark. But one line is yet apparent on the side (as the larva grows will become more distinct). The basal ridge is yellow white. Under side, feet and legs whitish, translucent. Tails reddish. Head a little broader than 2, subglobose, green with many fine white tubercles and hairs from same.
Aug. 9. Two days after first moult. Length 28/100. All green now, the gray or whitish appearances of yesterday lost. The dorsal stripe green. Only one side line, dark green.
Aug. 28. My larva has died trying to pass its second moult, and yesterday I received a note from Mrs. Peart that the one she had had just died at the same point. Therefore, we have failed for this year.

REFERENCES

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_____ 188. "Coenonympha I - Coenonympha galactinus." Butterflies of North America, 3: [219-223,] Pl. Coenonympha I., est. pp. 220-223, and figures *a* through *g*.